LC
671
R8

MATHEMATICS
IN
FEMALE EDUCATION.

LIBRARY OF CONGRESS.

[SMITHSONIAN DEPOSIT.]

Chap. LC 1671

Shelf .R8

UNITED STATES OF AMERICA.

The Rutgers Female Institute, Fifth Avenue,

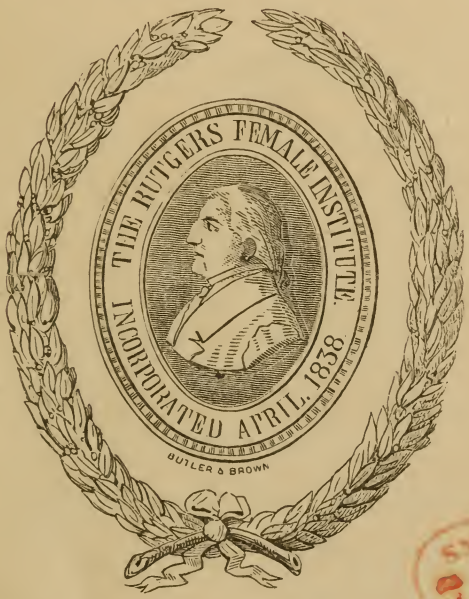
BETWEEN FORTY-FIRST AND FORTY-SECOND STREETS.

MATHEMATICS IN FEMALE EDUCATION.

ABSTRACTS FROM THE ARCHIVES

OF

Rutgers Female Institute,



366
5530

Nos. 435, 437, 439, FIFTH AVENUE,

NEW-YORK.

NEW-YORK:

JOHN A. GRAY, PRINTER, STEREOTYPER, AND BINDER,

CORNER OF FRANKFORT AND JACOB STREETS,

FIRE-PROOF BUILDINGS.

1860.

LC 1671
R8

Rutgers Female Institute.

President of the Institute.

HENRY M. PIERCE, A.M.

Board of Trustees.

REV. ASA D. SMITH, D.D, *President.*

E. D. BROWN, *Treasurer.*

JOHN W. C. LEVERIDGE, *Secretary.*

JOSEPH HOXIE,	REV. T. ARMITAGE, D.D.,
JOHN GRAY,	M. T. HEWIT,
RICHARD VAUGHAN,	HENRY M. PIERCE,
WILLIAM K. HINMAN,	E. H. MITCHELL,
CHARLES G. HARMER,	SPENCER KIRBY,
O. W. WOODFORD,	REV. W. S. CLAPP.

Rutgers Female Institute.

Our New Location.

In issuing a new Circular of our time-honored Institute, the Trustees present with pride the new and favoring circumstances under which the Fall Session of 1860 will open. More than twenty years ago, the Rutgers Female Institute was the pioneer of those Institutions which have since followed her lead, in establishing a high standard of female education; in offering an opportunity and all necessary appliances for developing the female mind in strength and understanding; and, by rigid and systematic training, in bringing it to that high culture, for which it had been thought incapable or unfitted. Through the wisdom of its early founders, in establishing a progressive system of education, and the untiring care and watchfulness of those who have had its subsequent supervision, the Rutgers Institute, after a long and successful career, is still found in the van of a host of similar institutions, which have worthily followed in her wake, and whose success is the best guarantee of the worth and efficiency of the system which she inaugurated. That she might not recede from her position of priority, so long maintained among the female schools of New-York, the Trustees felt constrained to join the onward march of improvement, and seek a new location "up-town." They now present the result of their choice—the new buildings on Fifth Avenue, between Forty-first and Forty-second streets—confident that the beauty and healthfulness of their location, and their adaptability in all respects to the purposes intended, will meet the approval of the friends of the Institution. The numerous *alumnæ* of our Institute, as well as its present patrons, will be reconciled to the desertion of the old buildings, around which cluster so pleasantly their youthful associations, when assured that their honored *Alma Mater*, in her new dress and new surroundings, retains the same fostering care and the same maternal regard for the daughters of her charge, as under the old *régime*.

To our Patrons.

The best evidence we can offer our patrons of the efficiency and usefulness of the Rutgers Institute in the cause of female education, is, undoubtedly, the living testimony of the six thousand young ladies who have enjoyed its advantages. These have borne for the Institute, into every part of our land, a reputation, for solid intellectual acquirements, elegant accomplishments, and healthful moral and religious training.

The recorded testimony is not less satisfactory than the living. In its early inception—under the wise guardianship of the present venerable Chancellor of the University, Rev. Dr. Ferris—Mrs. Sigourney says of its organization: "We rejoice that in our commercial and dominant city a system of education for the female sex is established of such breadth and solidity." But perhaps we can give no better evidence of the solid basis on which the course of instruction at this Institute is founded, than is presented in the Reports of the Committees on Mathematics, as they have appeared each successive year from the pens of gentlemen eminent for scientific attainments and devotion to educational progress.

The abstracts which we transcribe from these Reports show: 1st. The estimation in which men of high culture hold this science as a branch of education. 2d. The capability of the female mind to comprehend and master its principles, and receive benefit from the mental discipline acquired by its study. 3d. The extent and thoroughness with which its advantages are made available in the course of study pursued at the Rutgers Female Institute.

From the Report of 1840. Thomas McCauley, Esq., *and* George F. Allen, Esq., *Committee.*

After giving the duration and details of the examination, the Report says: . . . "The Committee were much gratified, and indeed surprised, at the readiness with which the pupils solved their problems, their evident familiarity with Mathematical principles, and their ready application of these principles to the solution of questions. The members of the Committee have rarely if ever witnessed an examination so creditable alike to teacher and pupil, evincing skillful, judicious, and faithful instruction on the part of the one, and intelligent, persevering, and well-directed study on the part of the other."

From the Report of 1841. E. C. Benedict *and* T. McCauley, Esqs., *Committee.*

. . . "Having now performed the duty assigned to them, the Committee are unwilling to let this opportunity pass without expressing to the Trus-

tees and Instructors of the Institute, their cordial approbation of the educational policy which unites with the lighter studies and more graceful arts of usual female accomplishments, that thorough instruction in solid learning and exact science, which can not fail to give steadiness and strength to the character, and fitness to perform, with a wiser and more careful discretion, the various and important duties, whose right performance should be the pride and the honor of American women"

From the Report of 1842. Prof. JOSEPH HENRY, *Sec. of Smithsonian Inst.*, WM. B. KINNEY, Esq., *and* Rev. GARDINER SPRING, D.D., *Committee.*

. . . "The subjects on which the young ladies were prepared for examination were the following: 1st. The general principles of Algebra, including the management of fractions and of surd quantities; the investigation of the binomial theorem; the rules of involution and evolution; arithmetical and geometrical progression, and the doctrine of equations of the first and second degree. 2d. The application of the foregoing principles to a great variety of problems, particularly of such as involved the reduction of a quadratic equation. 3d. Plane and Solid Geometry. 4th. The use and construction of Logarithms. 5th. Plane Trigonometry.

"The examination was conducted in a manner to put the knowledge of the pupils to the severest test. The numbers of the problems in Algebra corresponding to those in the text-book, were written on folded pieces of paper, and from the pile formed of these and placed upon the table before the examiners, each pupil drew one at random, so that previous to opening the paper she must have been entirely ignorant of the numbers of the problem she would be called upon to solve. The numbers of the propositions in Geometry were drawn in the same way, and each pupil was required to enunciate from memory the text of the proposition which had fallen to her lot. Also in the progress of the solution or demonstration, as the case might be, the several steps of the progress were required to be fully explained.

"The examination was continued until the Committee declared themselves fully satisfied with the evidences of proficiency which had been exhibited. They were surprised and delighted with the rapidity and precision with which the exercises were conducted, and although they have frequently attended examinations of males, yet they are free to say that they have never been present at one which surpassed this in the evidence given on the part of the pupils of a thorough acquaintance with the subjects.

"The Committee were pleased to find that the text-book used in Algebra was one which abounds in difficult problems, affording full exercise in the more abstruse parts of the subject, and that the principles of the science had been taught verbally by competent teachers as often as the progress of the pupil in practical expertness required a new explanation. It will be perceived by this remark, that the Committee are in favor of the old method of teaching called *drilling*, provided it be connected as it is in this case with frequent explanations of the principles.

"In the course of the examination the Committee have been strongly im-

pressed with the importance of the Mathematics as a branch of female education. A philosophical course of instruction is one which tends to develop in harmonious proportions all the faculties of the mind, and since from the constitution of the female, and her peculiar position in civilized society, she is prone to an undue exercise of the imagination, the Committee believe that she requires just that training which the proper study of the mathematics is so well calculated to give. Algebra, as it is taught in this Institution, affords an admirable exercise of the attention and the invention; and Geometry has ever been celebrated for the strength and precision it imparts to the reasoning faculties. The Committee are, moreover, convinced that there is nothing incompatible with all that is amiable and interesting in the female character, and the highest attainments in literature and science. Indeed there is an example of this at the present day. Mrs. Mary Somerville, although the learned authoress of a Mathematical exposition of the Celestial Mechanics of La Place, is well-skilled in music and in painting, and in the acquisition of her profound attainments, she has lost nothing of that sensibility and sweetness of character which ever made her the admiration of her acquaintances, and now render her the loved as well as respected of her family."

From the Report of 1843. Albert B. Dod, Esq., *and* Rev. John M. Krebs, D.D., *Committee.*

. . . "The Young Ladies of the First Class were examined in Algebra, Solid Geometry, and Plane Trigonometry. The examination on these several subjects was extensive and rigid; and the Committee were delighted with the satisfactory evidence which it afforded throughout, of the most thorough and systematic drilling in the principles and practical operations of those branches of abstract science. With scarcely an exception, the problems and theorems, which were all assigned by lot—and many of them were of the most difficult kind—were solved with the utmost facility, and accompanied with the most precise account of the several steps and processes employed, and of the principles upon which they depended. As a further test of their proficiency, the Principal had previously proposed to the class questions selected from works with which they had no acquaintance, and which they were required to solve in writing, in the presence of the Principal, and of the Assistant Teacher of Mathematics. These problems, about thirty in number, selected from the Cambridge problems and other works—many of them difficult of solution—and wrought out under circumstances which put to the completest proof the unassisted powers of the pupil, afforded, in connection with the oral examination, a thorough test of scholarship."

. . . "The Committee can not conclude without expressing anew the very high gratification which they have received from the evidence afforded by this examination of the successful training of the Young Ladies of the Institute in the exact sciences. It would have been difficult for any person to attend this examination without being made to feel that the power of close attention, inventive method, and accurate reasoning displayed by these young ladies at the black-board, must tend to impart strength to the mind, and to

prepare it to deal with all other objects with like precision and accuracy. It is impossible that they who have been so carefully exercised in mental operations that are definite, and by processes that are throughout exact, should not have received from it an influence toward the formation of a habit or general cast of mind, that is of inestimable value, as a preservative against the errors resulting from calling things by wrong names, and from vague and inconclusive modes of reasoning. The influence of this kind which is furnished by the exact sciences, can not be as well supplied by any other study. The ability *to think aright* is second only to the ability *to feel aright;* and it is no less indispensable to the highest comfort and happiness of woman in her social position, than it is to the success of man in his larger sphere of action. And the experience of the world, for ages, has proved the importance of Mathematical instruction as the means of training the mind to habits of close and accurate thinking.

"The Committee have, for these reasons, derived much satisfaction from observing the completeness of the Mathematical course in the Institute, the thoroughness with which this course is carried out in the instruction of the pupils, and the zealous assiduity and success with which the Young Ladies of this Class have so generally applied themselves to its study. The competency and faithfulness of their instructors could not have been more fully evinced or more gratefully rewarded."

From the Report of 1845. ELIAS LOOMIS, *Prof. Nat. Phil. and Astronomy, Yale College, and* EDWIN HALL, Esq., *Committee.*

After full details of the examination, the Report says: "The Committee can not refrain from expressing their satisfaction at the indications of a healthy public sentiment in favor of the introduction of substantial studies into a course of female education. If the character of those who are to enact our laws, who are to sit in judgment upon our lives and property, is shaped and moulded by a mother's influence—can she be deemed worthy of her high trust, who has learned but to admire a pretty story or the latest music? In these days of crude theories and reckless innovation, we may well despair of the republic, if during the forming period of their character, the rising generation are not imbued with right principles of thought and action before they leave the domestic circle. Let women be trained in those lighter accomplishments which impart to them their power over the lords of creation; but let their minds also be disciplined by severer studies for the discharge of their responsible duty—that of training up a new generation to which shall be intrusted the destinies of our country."

Fram the Report of 1846. Rev. STEPHEN ALEXANDER, D.D., Rev. GEO. B. CHEEVER, D.D., *and* ELBRIDGE SMITH, Esq., *Committee.*

. . . "The Committee beg leave to add, that facts such as those which they have felt themselves called upon to present, must be regarded as furnishing the best possible answer to those, if any, who may be disposed to question the utility or propriety of a somewhat extended and thorough Mathematical

course of instruction in our female seminaries—a course which, aside from the accuracy which it introduces or makes attainable in every other department of science, as well as of art, is itself preëminently adapted to secure the invaluable attainment of *thinking to the purpose*, that is, the power of close and accurate reasoning."

From the Report of 1847. Prof. CHARLES DAVIES, LL.D., *and* W. M. GILLESPIE, Esq., *Committee.*

The Committee report: . . . "That they were present at, and took part in the general examination of the 1st, 2d, and 3d departments in Algebra, Geometry, (Plane and Solid,) Plane Trigonometry, and the Differential Calculus.

"The pupils drew their subjects from a collection of folded ballots, containing only the number of the book and proposition in Geometry, or the page and example in Algebra; and then immediately proceeded to the black-board to draw their figures and solve their problems. They subsequently explained their operations, and were questioned and cross-examined by the members of the Committee, with a strictness and minuteness which made the examination a very severe ordeal and an accurate gauge of relative ability and acquirements.

"The results of these tests enable the Committee very sincerely and heartily to congratulate the Trustees of the Institution and the parents of the pupils upon the high degree of proficiency displayed. The general familiarity of the scholars with the subjects of examination, the promptitude of their answers, and their clear comprehension of the principles involved, testified to excellent original capacities for these studies, and to the admirable system of instruction by which they had been fostered and developed.

"The Committee desire also to express their gratification at the just importance and preëminence given to the study of Mathematics in this Institution. Those who object to a large infusion of this element in a course of Female Education, do so, either on the ground of the natural unsuitableness of woman's mind for such a study, or of its uselessness in after life. The first objection is effectually refuted by such evidence as is supplied by this examination. Those who adopt the assumption of the volatility of the female mind, and its incapacity for fixed thought, should be reminded that the correction of such defects where they do exist, is the characteristic attribute of that study of which the Sage of Verulam writes: 'If a man's mind be wandering, let him study the mathematics, for, in demonstration, if his mind be called away never so little, he must begin again.' Nor can either man or woman find that study *useless*, which, beyond all others, is calculated to induce habits of close and accurate thought, and to train the mind to the most faultless, exquisite, and transcendent logic. Women, as well as men, need to be taught how to reason, and will have constant use for this faculty every day and hour of their lives, and for the attainment of this great end, nothing can supply the place of mathematics.

"Although a young lady, after completing her mathematical course, may never again directly refer to the separate subjects, still, the effects upon her mind will remain, and in her future occupations she will find this knowledge of es-

sential service. It will give symmetry and order in the discharge of her household duties, and operate as a balance-wheel in controlling the excitements and impulses incident to every condition of life.

. . . "The commendation of those young ladies whose names have been mentioned for the honors, does not diminish the merits or impair the standing of their class-mates. The brightest stars in a constellation do not exclude the light or dim the lustre of the others; and although the severe tests of this examination have developed differences, they have also made manifest the pure and brilliant light of the entire galaxy."

From the Report of 1848. Prof. CHARLES DAVIES, LL.D., *and* JOSEPH MCKEEN, Esq., *Committee.*

. . . "The Committee were entirely unacquainted with the young ladies examined, and therefore had no knowledge of the relative standing of the members of the class, with what subject each might be particularly conversant, or of the questions which each might be most competent to answer.

"The examination was conducted without any aid drawn from the text-books, and hence each pupil was called on to answer from her knowledge of the subject, and could not avail herself of words committed to memory, or of impressions but faintly and imperfectly made upon the mind.

"The examination was continued for more than five hours, and searching and severe tests were applied. The answers, the demonstrations, and the discussion of abstract and difficult principles, all evince a high proficiency in mathematical science.

"On this point the Committee desire to be understood. They do not regard as belonging to the science, all that may be said on the subject. The *clear* and *distinct* idea; the choice of the *very* word which is the exponent of the idea, and no other; the arrangement of ideas so impressed on the mind according to the rules of rigorous logic, constitute, in the opinion of the Committee, the science of Mathematics. If the Committee are right in this opinion, the science of Mathematics is not acquired with a partial knowledge of the geometrical magnitudes. Much may be known of these in a general sense, without any clear perception of the accuracy of definition, the beautiful simplicity of an axiom, or the irresistible force of a demonstration.

"The Committee have confidence in stating, that they found the minds of the pupils imbued with the spirit of the subject. Very few propositions were declined, and scarcely any questions were missed; but these facts did not impress the Committee so strongly as the general accuracy of the language, evincing as it did, the capacity of receiving and the power of combining abstract ideas, and of marking those shades of difference which are perceived only by minds which have been rightly trained."

From the Report of 1849. E. C. ROSS, *Professor of Mathematics in the New-York Free Academy, and* Rev. Dr. JOHN M. KREBS, *Committee.*

"The Committee report: That they were present, and participated in, the examination of the classes in Algebra, Geometry, and Trigonometry; and were

highly gratified with the proficiency of the young ladies, and the manifest efficiency of the course of instruction which resulted in such an interesting exhibition of mathematical attainments.

"The examination in Algebra was thorough, embracing the whole range of subjects contained in the Text-Book. The most difficult theorems in Geometry were demonstrated with a clearness of reasoning, and accuracy of expression, that would have been creditable to the pupils of our highest institutions of learning.

"The manner of the examination, throughout, was of such a nature as utterly to preclude any possibility of making a mere *show* of simulated scholarship—of preparation on special topics, or drilling on selected problems—without that knowledge of principles and skill in their application, which alone makes the pupil *at home* with the illustrations and uses of the science which has been the professed subject of study. It was evident, not only that the pupils brought before us were mistresses of these principles, and expert in explaining and applying them to their important practical uses, but that the processes of training through which they had been led by their instructors, had tended to the formation of the not less important and valuable *habit* of thinking. And, although, as might be expected, there were differences both of capacity and of attainment, nevertheless was there evinced by all these pupils, a degree of interest in the subjects of study, at once most creditable to themselves and to their teachers; and an amount of conscientious devotion to the duties required of them, quite remarkable when contrasted with the listless indolence which it has been our lot too often to witness, among the greater number of youth of the opposite sex, in our Colleges."

From the Report of 1850. CHARLES W. HACKLEY, *Professor of Mathematics and Astronomy, Columbia College,* GERARDUS B. DOCHARTY, *Assistant Professor of Mathematics and Natural Philosophy, Free Academy, and* WM. H. CROSBY, Esq., *Committee.*

. . . "That they were present at the time, and took a prominent part in the examination of the classes in Algebra, Geometry, Plane Trigonometry, and Analytics; their time (five hours) not allowing them to enter into an examination of the graduating class in the Differential Calculus. Much to their own regret, and to the disappointment, perhaps, of the young ladies, this branch of mathematics was not reached; but so far as the examination went, it showed that they were well versed in mathematical science; that they had a profound knowledge of its principles, and a ready skill in applying them to the elucidation of the various subjects which were presented before them: it confirmed the Committee in the exalted opinion they have hitherto held of the Rutgers Female Institute, and its reputation as a Seminary of high rank in literature and science.

"When we consider the importance of the study of Mathematics to the arts of civilized life; its effects in disciplining the mind; its power in controlling and concentrating thought; in giving symmetry and order to sentiments and

ideas, we can not place too much value on those institutions of learning, in which it is properly and systematically taught.

"The examination in Algebra was thorough and complete; embracing Equations of the First and Second Degrees; the Calculus of Radicals; the Binomial Theorem; Indeterminate Coëfficients; the General Theory of Equations; in fact, the whole range of subjects contained in the Text-Books was clearly discussed and intelligently exemplified, with a facility of expression, and a perspicuity of reasoning, that gave evidence that the process of training through which the young ladies under examination had been led by their instructors, was such as to make them correct thinkers as well as expert analysts.

"The Committee had expected an intellectual entertainment of no ordinary kind; but their anticipations were far surpassed by the actual and vivid reality.

"Not satisfied with their performance on the black-board, the neatness and accuracy of their solutions, the Committee questioned them minutely, in order to ascertain the depth of their mathematical knowledge; compelling them to pass an ordeal which none could accomplish without fully understanding the subject. Here could be no deception. Their manner of answering the most difficult and intricate questions, gave ample evidence that they were mistresses of the science.

"Had the Committee spent less time at Algebra, the young ladies would have had an opportunity of proceeding farther, and displaying their ability in the more beautiful and interesting branches of Analytical Geometry, and the Differential Calculus. But they may remember, that although the subjects in which they were the most critically examined, came first in order, and may be esteemed of a lower grade, still they are far from being the most easy to gifted minds. Those who have travelled through the intricate paths of Algebraical Analysis, as these young ladies have done, and become so intimately acquainted with every step of the progress, with every inch of the ground, find the fields of Analytics and the Differential Calculus comparatively a garden of flowers, a place of literary repose.

"In Plane and Solid Geometry, Trigonometry, and Analytical Geometry, the examination was continued with the same impartiality and success. The young ladies drew their problems from a collection of folded ballots, and proceeded to the black-board to delineate and demonstrate them. This they performed with the readiness and accuracy of accomplished mathematicians.

"Under an examination of this kind, nothing but a profound knowledge of the subjects could have enabled them to triumph. The graduating class particularly gave evidence that to superior minds they had united indefatigable perseverance and industry. These properly fostered and directed by their talented Principal, and accomplished lady professor, have carried them to a high degree of eminence in mathematical acquirements, for the attainment of which, the Committee beg leave to congratulate them, and the Institution that has performed its duty in so efficient and successful a manner."

From the Report of 1851. Prof. CHARLES DAVIES, LL.D., *and* Prof. JOHN A. NICHOLS, *Committee.*

. . . "The classes were examined in the following subjects:

"1st. Algebra; from the text of M. Bourdon.

"2d. Geometry; from the text of A. M. Legendre.

"3d. Trigonometry, Plane and Spherical.

. . . "In all the subjects, the Committee are happy to say, that the pupils manifested a high degree of proficiency. The Committee were entirely unacquainted with the pupils whom the Faculty presented for examination, and even with most of the Instructors who had taught them. They went as strangers to examine the choice fruits of labor at the close of the academic year. They found those fruits abundant, and of the best quality.

"The clearness and precision of the answers, the accuracy of the demonstrations, the depth and tone of thought, which were so strikingly and so strongly exhibited, are unmistakable evidences of good instruction and good scholarship.

"A course of scientific instruction, to be useful, must be thorough and uniform in its methods. The same general language is employed in Arithmetic, Algebra, Geometry, and the higher Calculus; and the same laws of combination and the same principles of reasoning are alike applicable in all. In the recent examination the Committee have witnessed the good results of such a uniformity.

"The Committee also believe, that the clear conceptions, the accurate use of language, the habit of arranging and classifying ideas, and the simple and rigorous logic required in mathematical investigations, are not only necessary for scientific pursuits, but are also the best basis of a general education. High intellectual development forms the only true foundation for those accomplishments and elegancies of life which give to character its most attractive graces. The root and stem are necessary to the flower, which indeed can not bloom without them. The hardest metal takes the highest polish, and the consistency of the diamond is necessary to make it the queen of gems."

From the Report of 1854. ELIAS LOOMIS, *Professor of Natural Philosophy and Astronomy, Yale College, and* F. L. HODGES, Esq., *Committee.*

. . . "The Committee are satisfied that the Mathematical instruction at the Institute is conducted upon a judicious system and in a faithful manner. The pupils are made to comprehend clearly the principles which are taught. The study of the Mathematics is not made a blind effort of memory without the exercise of reason. This is abundantly proved by the facility with which the pupils solved difficult problems; and by their answers to numerous questions propounded by the Committee. We are satisfied that the standard of mathematical attainment at the Institute is much above that of Female Seminaries generally in our country."

From the Report of 1855. Prof. ELIAS LOOMIS *and* JOSEPH MCKEEN, Esq., *Committee.*

. . . "The Committee can not conclude their Report without expressing the gratification they have derived from witnessing the continued evidence of the estimation in which Mathematical studies are held at the Institute, and the success with which they are cultivated. While we are not aware of any institution for general education which does not comprehend some portion of the mathematics in its list of studies, it is too often the case in our female seminaries that young ladies are taught to nibble daintily at the Mathematics, as if a hearty meal might prove injurious, either to their intellects or to their morals. Indeed we have been pained to find that some who have charge of the institutions were more solicitous about the neatness with which a geometrical diagram might be drawn, than they were about the correctness; and valued grace of manner above profoundness of intellect. We doubt whether there is another Female Seminary in the United States, where six young ladies can be found, who can furnish more elegant solutions of the test-questions, than have been furnished by six members of the graduating class; we believe that the mathematical studies are pursued at the Institute with a thoroughness and success not surpassed by any similar institution in the country; we know that as regards very many of them, the Institute is in this respect incomparably their superior. To say more might be deemed invidious; to say less, would be injustice to those who have prescribed the course of study at the Institute; and injustice to her to whom the mathematical training of the pupils has been intrusted."

From the Report of 1857. Prof. RICHARD H. BULL *and* Prof. J. A. NICHOLS, *Committee.*

The Committee say in their Report: . . . "That they examined the pupils during a period of nearly five hours, in nearly every branch of pure Mathematics. The questions were in Algebra, including the Binomial Theorem for any exponent, and the general Theory of Equations; Plane and Solid Geometry; Plane Trigonometry and Analytical Geometry of two dimensions. This course is very extensive, and the Committee were highly gratified with the answers of the young ladies."

. . . "That the pupils of Rutgers Female Institute can show such progress as was exhibited to the Committee, in this grand and perfect science, is a cause of pride to the Trustees of the Institute, to all its instructors, and especially to the accomplished instructress of this difficult branch of knowledge. They have reason to be proud that such results of its teachings can be shown to the public, and such an example set to other institutions of learning."

. . . "No expressions of praise that could be employed would be too great in speaking of the degree of scholarship exhibited by all these young ladies. The precision and correctness of their answers, and the elegance of their written exercises, could only be exceeded by the charming modesty with which these rich fruits of a sound education—an education which cultivates at the same time the mind and the heart, the taste and the manners—were brought to view by the scrutinizing questions of the Examining Committee."

From the Report of 1859. J. T. BENEDICT, *Professor of Mathematics in the New-York Free Academy, and* Prof. J. H. FANNING, *Committee.*

. . . "It is very gratifying to the Committee that they are able to give so favorable a report of the Mathematical attainments of the present graduating class. It is particularly worthy of remark that the Institute should continue to maintain its high position as leader in the cultivation of the Mathematics, notwithstanding it is in a Metropolitan City, where young ladies have many inducements to be governed by the dictates of fashion, rather than by the laws of exact science. The examination was continued during four hours, and embraced the subjects of Geometry, Trigonometry, Plane and Spherical, with their application to Surveying, Navigation, Mensuration, and Astronomy. The examination in Geometry was of the most satisfactory character, and indicated faithful and systematic instruction, as well as untiring application by the instructed. The ease with which the members of the class enunciated the propositions throughout the whole range of Plane, Spherical, and Solid Geometry, evinced a remarkable degree of familiarity with the subject. The demonstrations were so clear and concise, as to furnish the most satisfactory evidence of the salutary effect of the logic of Geometry upon the minds of young ladies. In this connection the Committee can not refrain from expressing an opinion, that such results can only be attained by leading the pupil, step by step, through the *entire Geometrical field*, instead of giving attention to only a small portion of the same, as is too frequently done in our female schools. We can not place too high an estimate upon the importance of thorough and systematic instruction in Geometry, when we reflect that the logic which leads a young lady to an undeniable geometrical truth, is the same in kind, as that which must guide her to just conclusions in Literature, Philosophy, and Art. In Trigonometry, there was the same degree of proficiency manifested, indicating a knowledge both of principles and their applications. The Committee noticed with much pleasure the freedom and power evinced by some of the young ladies in this subject, that evidently were acquired by their previous thorough acquaintance with Algebra and Geometry. Finally your Committee feel confident that the Institute will continue to maintain its justly high position as a mathematical school, so long as there is such vigorous faithfulness on the part of its instructress, and such persevering industry on the part of the pupils."

From the Report of 1860. Prof. J. T. BENEDICT, Prof. B. S. HEDRICK, *and* Prof. C. W. HACKLEY, *of Columbia College, Committee.*

. . . "The Committee have had comparatively a familiar acquaintance with the Mathematical course of Rutgers Institute for a succession of years, and with the proficiency of the graduating pupils in the principles of the science and their application; and they cheerfully avail themselves of this Report to express their satisfaction at the manner in which the fifteen graduates of to-day have sustained the well-earned reputation of their *Alma Mater*—and to congratulate the Board of Trustees on this evidence of the efficiency and faithfulness of their present corps of teachers."

It is gratifying to the pride of race in every human breast, to be able to appeal to such evidence as is given in these Reports, of the capacity of the female mind to comprehend the sublime truths of abstract science, and its ability to rigidly apply these principles in unravelling the mysteries of creation, and in explanation of those wonderful phenomena which fill alike the uneducated and the educated mind with awe and reverence for the power and the goodness of that Being whose mind alone comprehends the immensity of the universe, and whose Almighty hand has fashioned it, and endowed it with life and motion.

It must be evident to every reflecting mind, that the results which have drawn this testimony from men, themselves so severely trained and so accomplished in this department of learning—as those whose distinguished names are appended to these Reports—could be attained only by unremitted application, long continued under the most favoring circumstances, and by a systematic progression, from step to step, to its full attainment. *And this is true;* for many of these young ladies, who have drawn these commendations from so severe an ordeal, commenced at the Institute with their A B C, and ascended with their years and their acquisitions through the different departments to their maturity and final graduation. This uninterrupted application and systematic progress is, in a measure, the secret of their success, and of the extent of their acquirements.

In estimating the advantages of these acquirements in the duties and responsibilities of after life, aside from the discipline of mind attained by their study; aside from the greater ease to comprehend less abstruse subjects, the order and system which the well-trained mind brings out of the chaos of every-day occurrences, and the charm which female education throws over the dull routine of domestic duties—aside from these, what benefit does it not confer, and what power does it not give her, in her own more peculiar sphere, in the higher and holier duties of maternal life. To be able, with a mother's love, to train aright the growing intelligence of her offspring; to meet the first bewildered astonishment of the little neophyte at the wonderful and sometimes awful phenomena of nature, with the assurance that these are governed by fixed laws, and the explanation of those laws; and, as her child's capacity enlarges, to interpret nature in all its phases, and thus lead the young mind from nature to the great Author of all her laws; to be able, with the force of her own acquired understanding, to impress these great truths upon her child's mind in the most plastic period of its life, and transmit to it the blessings she has herself received in her own education, must be to the mother a source of exquisite happiness, and lead her to look back upon her school-days and her school-day acquisitions, as of more value to her than rubies or fine gold.

LIBRARY OF CONGRESS
0 019 646 452 9